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The Role Of Uterine, Endometrial And Subendometrial Blood Flow Measured By 3D Power Doppler Ultrasound In The Prediction Of Pregnancy During In Vitro Fertilisation Treatment

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Context Adequate blood supply to the uterus and high oocyte quality are essential for successful pregnancy. Numerous studies have focused on evaluating the endometrial and subendometrial blood flow as possible in vitro fertilisation (IVF) outcome predictors, however, the results are conflicting.

Objective To investigate the role of uterine, endometrial and subendometrial blood flow as pregnancy predictors in women with different ovarian reserves undergoing IVF cycles.

Methods Endometrial volume, vascularization index (VI), flow index (FI) and vascularization-flow index (VFI) were measured using the 3D power Doppler ultrasound. Mann-Whitney U-test was used for statistics. The results are presented as mean ± SD.

Patients The study included 56 women (age 34,27 ± 3,98 years). Patients were divided into two groups: Group 1 (n = 20) with diminished ovarian reserve (DOR) and, Group 2 (n = 36) with tubal-peritoneal infertility. Depending on the outcome of IVF, two subgroups were identified: Subgroup 1a (n = 8) – pregnant women and Subgroup 1b (n = 12) – non-pregnant women.

Intervention On day 2 of menstruation, the number of antral follicles, as well as Anti-Mullerian hormone (AMH) and follicule-stimulating hormone (FSH) levels, were measured. Ovarian stimulation was performed using short gonadotropin releasing hormone (GnRH) antagonist protocol.

Main Outcome Measure Lower indices were observed in patients with DOR and ineffective IVF cycle.

Results In pregnant women with normal ovarian reserve, the endometrial volume was significantly higher than in non-pregnant women with DOR (2.53±0,19 mm3 vs 0.82±0.25 mm³, respectively; p=0.001). In the patients with DOR whose IVF was ineffective, the myometrial VI (11,41 ± 2,19 mm3 vs 7,49 ± 0,97 mm3 , p = 0.003) and VFI (1,77 ± 0,35 mm3 vs 0,94 ± 0,05 mm3, p = 0.009) were 1.6 and 1.5 times lower, respectively, and the subendometrial VFI (0,92 ± 0,64 mm3 vs 0,25 ± 0,15 mm3, p = 0.013) was 2.5 lower than in the females with normal ovarian reserve whose IVF was also ineffective.

Conclusions Lower uterine blood flow rates were found in women with DOR and inefficient IVF cycle. Therefore, measuring the endometrial volume using 3D-ultrasound before embryo transfer may be regarded as a good pregnancy predictor in women undergoing IVF cycles.